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MAR 28 2007

## AMENDMENTS TO THE CLAIMS

1. (Currently Amended) A method of generating hydrogen and oxygen gas comprising steps of: injecting water molecules into a plasma to dissociate ~~said the~~ molecules into a hydrogen species and an oxygen species[(:)], separating within ~~said plasma~~ ~~said the~~ hydrogen species from ~~said the~~ oxygen species[(:)] within the plasma, and removing each of ~~said the~~ oxygen species and ~~said the~~ hydrogen species from ~~said the~~ plasma so that ~~said oxygen~~ the hydrogen species forms gaseous ~~oxygen~~ hydrogen and ~~said hydrogen~~ the oxygen species forms gaseous ~~hydrogen~~ oxygen.
2. (Currently Amended) ~~A method as set forth in claim~~ The method of Claim 1 further comprising the step of: generating said wherein the plasma is generated in the microwave frequency segment of the electromagnetic spectrum.
3. (Currently Amended) ~~A method as set forth in claim~~ The method of Claim 1 further comprising the step of: generating said wherein the plasma is generated in the radio frequency segment of the electromagnetic spectrum.
4. (Currently Amended) ~~A method as set forth in claim~~ The method of Claim 1 further comprising the step of: generating said wherein the plasma is generated from low frequency electromagnetic waves.
5. (Currently Amended) ~~A method as set forth in claim~~ The method of Claim 1 further comprising the step of: generating said wherein the plasma is generated from an arc discharge.
6. (Currently Amended) ~~A method as set forth in claim~~ The method of Claim 1 further comprising including the step of[(:)] developing an electromagnetic field from a source of electrical energy to define a plasma reaction zone, said with the water molecules being injected into said the plasma reaction zone.
7. (Currently Amended) ~~A method as set forth in claim~~ The method of Claim 6 further comprising the step of: developing said wherein the electrical energy is

developed from at least one of the following: solar energy, hydroelectric energy and geothermal energy.

8. (Currently Amended) ~~A method as set forth in claim~~ The method of Claim 6 further comprising the steps of: developing said wherein the electrical energy is developed from a hydroelectric source~~[[;]]~~ and recovering at least a portion of water used by the hydroelectric source is recovered for use as said injected the water molecules which are injected into the plasma.

9. (Currently Amended) ~~A method as set forth in claim~~ The method of Claim 6 further comprising the steps of: developing said wherein the electrical energy is developed from a geothermal source in which water vapor is emitted~~[[;]]~~, and recovering at least a portion of ~~said the~~ emitted water vapor is recovered for use as said injected the water molecules which are injected into the plasma.

10. (Currently Amended) ~~A method as set forth in claim~~ The method of Claim 1 further comprising the step of recovering waste steam to provide ~~said the~~ injected water molecules.

11. (Currently Amended) ~~A method as set forth in claim~~ The method of Claim 1 wherein said injecting step includes the step of concurrently injecting a gas is injected into said the plasma concurrently with the water molecules.

12. (Currently Amended) ~~A method as set forth in claim~~ The method of Claim 11 wherein said injecting step includes the step of injecting air is also injected into said the plasma.

13. (Currently Amended) ~~A method as set forth in claim~~ The method of Claim 11 wherein said injecting step includes the step of injecting nitrogen is also injected into said the plasma.

14. (Currently Amended) ~~A method as set forth in claim~~ The method of Claim 11 wherein said injecting step includes the step of injecting an inert gas is also injected into said the plasma.

15. (Currently Amended) ~~A method as set forth in claim~~ The method of Claim 14 wherein said the inert gas injecting step includes injecting a selected one injected into the plasma is selected from the group consisting of xenon, neon, krypton, helium, and argon, and combinations thereof into said plasma.

16. (Currently Amended) ~~A method as set forth in claim~~ The method of Claim 1 wherein said injecting step includes the step of injecting steam is also injected into said the plasma.

17. (Currently Amended) ~~A method as set forth in claim~~ The method of Claim 1 wherein said separating step includes the step of placing a porous membrane adjacent said plasma wherein said wherein the hydrogen species are separated from the oxygen species by passing the hydrogen species through a porous membrane includes having a plurality of pores having with a diameter intermediate a diameter of said larger than the hydrogen species and said smaller than the oxygen species such that said only the hydrogen species can permeate[[s]] through said the membrane.

18. (Currently Amended) ~~A method as set forth in claim~~ The method of Claim 17 wherein said placing step includes the steps of: forming said wherein the porous membrane as a first tube; placing said first tube is formed as a tube which is disposed within a nonporous second tube such that said with a reaction zone is confined being formed between said first tube and said second tubes, said and the water molecules being are injected into said the reaction zone from a first end of said second the nonporous tube.

19. (Currently Amended) ~~A method as set forth in claim~~ The method of Claim 17 wherein said placing step further includes placing the hydrogen species is passed through a plurality of membranes in a selected one of a parallel and a serial arrangement

20. (Currently Amended) ~~A method as set forth in claim~~ The method of Claim 17 further comprising electrically biasing said ~~herein the membrane is electrically biased~~

21. (Currently Amended) ~~A method as set forth in claim~~ The method of Claim 20 wherein said biasing step includes the step of wherein the membrane is biased by applying a DC voltage to said ~~the~~ the membrane.

22. (Currently Amended) ~~A method as set forth in claim~~ The method of Claim 20 wherein said biasing step includes the step of wherein the membrane is biased by applying an AC voltage to said ~~the~~ the membrane.

23. (Currently Amended) ~~A method as set forth in claim~~ The method of Claim 22 wherein said biasing step includes the step of wherein the membrane is biased by applying a high frequency voltage to said ~~the~~ the membrane.

24. (Currently Amended) ~~A method as set forth in claim 1 wherein said separating step includes the step of generating hydrogen gas and oxygen gas, comprising steps of: injecting water molecules into a plasma to dissociate the molecules into a hydrogen species and an oxygen species, separating the hydrogen species from the oxygen species within the plasma by pumping said the oxygen species and said the hydrogen species through a converging diverging nozzle to form an exit beam wherein said the oxygen species emerges from said the nozzle substantially along a core of said the beam and said the hydrogen species migrates outwardly of said the beam, and removing each of the hydrogen species and the oxygen species from the plasma so that the hydrogen species forms gaseous hydrogen and the oxygen species forms gaseous oxygen.~~

25. (Currently Amended) A method as set forth in claim 24 wherein ~~said the~~ the converging diverging nozzle is a Laval nozzle.

26. (Currently Amended) ~~A method as set forth in claim~~ The method of Claim 1 wherein said separating step includes including the step of quenching said the oxygen species and said the hydrogen species upon exiting said plasma to prevent recombination thereof.

27. (Original) A method as set forth in claim 26 wherein ~~said quenching step includes the step of~~ the species are quenched by pumping ~~said the~~ the oxygen species and ~~said the~~ the hydrogen species through an expansion nozzle prior to ~~said shock cooling step quenching~~.

28. (Currently Amended) ~~A method as set forth in claim~~ The method of Claim 1 wherein said separating step includes including the step of developing an electrical potential across ~~said the~~ the plasma wherein ~~said, with the potential interacts~~ interacting with a differing different electrical potentials of ~~each of said the~~ the hydrogen species and ~~said the~~ the oxygen species to effect separation.

29. (Currently Amended) ~~A method as set forth in claim~~ The method of Claim 1 wherein said separating step includes including the step of developing a magnetic field across ~~said the~~ the plasma wherein ~~said, with the field interacts~~ interacting with a differing different magnetic moments of ~~each of said the~~ the hydrogen species and ~~said the~~ the oxygen species to effect separation.

30. (Currently Amended) ~~A method as set forth in claim~~ The method of Claim 29 wherein said separating step includes including the step of developing an electrical potential across ~~said the~~ the plasma wherein ~~said, with the potential interacts~~ interacting with a differing different electrical potentials of ~~each of said the~~ the hydrogen species and ~~said the~~ the oxygen species to effect separation.

31. (Currently Amended) ~~A method as set forth in claim~~ The method of Claim 1 wherein said separating step includes including the step of introducing a catalyst into ~~said the~~ the plasma to effect termination of the active species in ~~each of said the~~ the hydrogen species and ~~said the~~ the oxygen species.

32. (Currently Amended) ~~A method as set forth in claim~~ The method of Claim 1 wherein said separating step includes including the step of introducing a homogenous reactant into ~~said the~~ the plasma to react with ~~said the~~ the oxygen species to prevent recombination of the oxygen species with ~~said the~~ the hydrogen species.

33. (Currently Amended) ~~A method as set forth in claim~~ The method of Claim 32 wherein ~~said introducing step includes~~ including the step of introducing carbon monoxide such that an OH intermediate combines with ~~said the carbon monoxide resulting and results~~ in the production of hydrogen atoms and carbon dioxide.

34. (Currently Amended) ~~A method as set forth in claim~~ The method of Claim 1 wherein ~~said separating step includes the step of introducing a sacrificial component is introduced into said the plasma to react with said the oxygen species to prevent recombination of the oxygen species with said the hydrogen species.~~

35. (Currently Amended) ~~A method as set forth in claim~~ The method of Claim 34 wherein ~~said introducing step includes~~ including the step of introducing carbon such that an OH intermediate combines with ~~said the carbon resulting and results~~ in the production hydrogen atoms and carbon monoxide.

36. (Currently Amended) ~~A method as set forth in claim~~ The method of Claim 1 wherein ~~said separating step includes the step of introducing a~~ an atomic or molecular component is introduced into ~~said the plasma concurrently with said the water molecules to inhibit recombination of said the oxygen species and said the hydrogen species~~

37. (Currently Amended) ~~A method as set forth in claim~~ The method of Claim 36 wherein ~~said introducing step includes the step of introducing iodine (I<sub>2</sub>) is introduced into said the plasma.~~

38. (Currently Amended) ~~A method as set forth in claim~~ The method of Claim 1 wherein ~~said separating step includes~~ injecting a cryothermic gas selected to be non-reactive with one of ~~said the oxygen species and said the hydrogen species is introduced into said the plasma to shock cool said the oxygen species and said the hydrogen species to prevent recombination thereof~~

39. (Currently Amended) ~~A method as set forth in claim~~ The method of Claim 1 ~~further comprising~~ including the steps of recovering energy from ~~said the plasma wherein said and converting the recovered energy is converted to a useful form.~~

[[37]] 40. (Currently Amended) ~~A method as set forth in claim~~ The method of Claim 39 wherein said recovering step includes the step of the energy is recovered by inducing electrical current in electromagnets placed about said the plasma from the electro-magnetic energy of said the plasma.

[[38]] 41. (Currently Amended) ~~A method as set forth in claim~~ The method of Claim 39 wherein said recovering step includes the step of the energy is recovered by placing a heat exchanger proximal said in proximity to the plasma to recover heat energy therefrom.

[[39]] 42. (Currently Amended) ~~A method as set forth in claim~~ The method of Claim 39 wherein said recovering step includes the step of the energy is recovered by placing a heat pipe within said the plasma to recover heat energy therefrom.

[[40]] 43. (Currently Amended) ~~A method as set forth in claim~~ The method of Claim 39 wherein said recovering step includes the step of energy is recovered by placing solar cells proximal said in proximity to the plasma to recover light energy therefrom.

[[41]] 44. (Currently Amended) ~~A method as set forth in claim~~ The method of Claim 39 wherein said recovering step includes the step of energy is recovered by placing a thermoelectric device proximal said in proximity to the plasma to recover electrical energy therefrom.

[[42]] 45. (Currently Amended) ~~A method as set forth in claim~~ The method of Claim 39 wherein said recovering step includes the step of energy is recovered by placing a thermoionic device in proximity to the plasma to recover electrical energy therefrom.

[[43]] 46. (Currently Amended) ~~A method as set forth in claim~~ The method of Claim 1 wherein said injecting step includes including the steps of injecting said the water molecules into a first stream and further injecting an inert gas into a second stream, said first stream and said second stream having with an angle therebetween ranging from 0° to 180° between the streams.

[[44]] 47. (Currently Amended) ~~A method as set forth in claim~~ The method of Claim 1 wherein said the plasma is a pulsed plasma.

[[45]] 48. (Currently Amended) ~~A method as set forth in claim~~ The method of Claim 1 wherein said the plasma is an oscillating plasma of having a controlled frequency.

[[46]] 49. (Currently Amended) ~~A method as set forth in claim~~ The method of Claim 1 wherein said the plasma is an oscillating plasma of having a variable frequency.

[[47]] 50. (Currently Amended) ~~A method as set forth in claim~~ The method of Claim 1 wherein said the plasma is developed at a pressure of between 1 mtorr to and 1000 atmospheres.

[[49]] 51. (Currently Amended) ~~A method as set forth in claim~~ The method of Claim 1 wherein said the plasma is developed at a temperature between 5 °C and 20,000° K.

[[50]] 52. (Currently Amended) ~~A method as set forth in claim~~ The method of Claim 1 wherein said the plasma is developed at a frequency between 50 Hz and 100 GHz.

[[51]] 53. (Currently Amended) ~~A method as set forth in claim~~ The method of Claim 1 further comprising the step of introducing a seed material into said the plasma to thereby lower the temperature thereof of the plasma.

[[52]] 54. (Currently Amended) ~~A method as set forth in claim 1~~ The method of Claim 51 wherein said introducing step includes the step of selecting said the seed material from materials having has a low ionization potential[s]].

[[53]] 55. (Currently Amended) ~~A method as set forth in claim 52~~ The method of Claim 54 wherein said selecting step includes the step of selecting from the seed material is selected from the group consisting of alkali, and alkaline earth metals and combinations thereof.



[[54]] 56. (Currently Amended) ~~A method as set forth in claim~~ The method of Claim 52 wherein said the seed material is mercury.

[[55]] 57. (Currently Amended) ~~A method as set forth in claim~~ The method of Claim 1 wherein said removing step includes including the step of introducing a catalyst into said the plasma to terminate said the oxygen species and said the hydrogen species and to redirect said the oxygen species and said the hydrogen species to molecular hydrogen and molecular oxygen.

[[56]] 58. (Currently Amended) ~~A method as set forth in claim 55~~ The method of Claim 57 wherein said the catalyst has a high surface area.

[[57]] 59. (Currently Amended) ~~A method as set forth in claim 55 wherein said catalyst is of generating hydrogen gas and oxygen gas, comprising steps of: injecting water molecules into a plasma to dissociate the molecules into a hydrogen species and an oxygen species, separating the hydrogen species from the oxygen species within the plasma, introducing a silica gel catalyst into the plasma to terminate the dissociation of the water molecules and to redirect the oxygen species and the hydrogen species to molecular hydrogen and molecular oxygen, and removing the molecular hydrogen and the molecular oxygen.~~

[[58]] 60. (Currently Amended) ~~A method as set forth in claim 4 wherein said injecting step further includes the steps of~~ of generating hydrogen gas and oxygen gas, comprising steps of: injecting water molecules into a plasma to dissociate the molecules into a hydrogen species and an oxygen species, injecting nitrogen into the plasma concurrently with said the water molecules into said plasma such that nitric oxide is formed as a byproduct; separating the hydrogen species from the oxygen species within the plasma, removing each of the hydrogen species and the oxygen species from the plasma so that the hydrogen species forms gaseous hydrogen and the oxygen species forms gaseous oxygen, and injecting an acid post plasma such that said the nitric oxide reacts with said the acid to form a salt, thereby releasing molecular hydrogen.

[[59]] 61. (Currently Amended) ~~A method as set forth in claim 58~~ The method  
of Claim 60 wherein ~~said~~ the acid is phosphoric acid.